

Inventory of wildlife in the PNAMI serranías del Iñao

Inventario de fauna en el Parque Nacional de las Serranías del Iñao (PNAMI)

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Abstract

Bolivia's wild fauna should be one of the most important natural resources; is however a neglected resource, in that way is in constant threat by anthropic activities. Chuquisaca government information is lack about this resource. That's why this project was one of the first initiatives that allowed generating information about the wild fauna, taking as a place of action some communities from PNANMI Iñao Highlands, being this one of the richest reservations of the state, it is also the refuge of a significant biological diversity and cultural values as well. The current knowledge of this investigation it is more than a species list, because recovers the communities' traditional knowledge, in which is reflect the value that is given to a wild fauna, allowing in this way identify the resource's exploitation potential, and what is more the steps for its manage and conservation.

Wildlife, Biodiversity, Human activities, Storage, Conservation, Cultural values

Resumen

La fauna silvestre de Bolivia es uno de los recursos naturales, que debería ser importante pero ha sido uno de los recursos más olvidados, por lo tanto es uno de los recursos más amenazados por las actividades antrópicas. El departamento de Chuquisaca tiene mayor ausencia de información de este recurso. En este sentido el proyecto se convierte en una de las primeras iniciativas que permitirá generar mayor información sobre la fauna silvestre, tomando como lugar de acción algunas comunidades del PNANMI Serranías del Iñao. Por ser una de las reservas más ricas del departamento, que alberga significativa diversidad biológica y valores culturales, el conocimiento generado va más allá que una lista de especies, ya que rescata el conocimiento tradicional de las comunidades involucradas, lo cual refleja la valoración que se le da a la fauna silvestre, permitiendo de esta manera poder identificar las potencialidades de aprovechamiento de este recurso así como poder dar pautas para su manejo y conservación.

Fauna silvestre, Diversidad biológica, Actividades antropológicas, Reserva, Conservación, Valores culturales

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Introduction

The most common meaning of the term wildlife includes all terrestrial vertebrates that live freely and occupy different habitats. This includes the species of amphibians, reptiles, birds and mammals. The process of inventorying biodiversity (fauna and flora) is a fundamental activity for its knowledge, it is a very complex process due to the diversity of species that inhabit a certain ecoregion, due to the specificity and complexity of collection techniques. and identification and due to the need for human resources dedicated to each group of fauna, to facilitate social interaction and develop horizontal work, work must be done with local communities, making local, traditional and scientific knowledge compatible through community workshops and direct interviews.

On the other hand, the Serranía del Iñao is very important for being a refuge for a diversity of animal and plant species in danger of extinction. The Guaraní - Quechua Center considered the Serranía del Iñao as the nucleus for the reproduction of wild animals in the region, which in some seasons migrate to the surrounding lowlands of the area; becoming one of the sources of food for the Guaraní people.

Problem statement

In a world that changes rapidly, natural systems and their elements change even more rapidly, plant and animal species suffer from this situation, a better knowledge of them and in particular of animals is an important objective to know their status, role in the functioning of the ecosystem, to design adequate protection and conservation actions that allow a better use of the services they provide, on the other hand, wildlife represents an important resource for indigenous and peasant communities, becoming a source of protein in their diet.

The loss or decrease in the population of some species causes strong ecological imbalances that are manifested in the emergence of diseases, plagues, producing a chain of consequences that finally diminish and affect the quality of life of rural and indigenous populations that are in direct contact with these resources.

Hence, the lack of research on the subject and human resources trained in the subject are essential to propose solutions for the management and conservation of wildlife and their habitats.

The studies and inventories of Wild Fauna in Bolivia are mostly consolidated in the departments of La Paz, Santa Cruz and Cochabamba, thanks to the existence of Centers and Museums accredited by the DGB (General Directorate of Biodiversity), which has allowed that in the In recent years initiatives have been undertaken for the sustainable use of some wild species such as the yacare caiman in Beni and Pando, the pissaca or Andean partridge in La Paz, however these have been the result of long research processes that have started from an inventory to studies of population dynamics of these particular species.

The fauna of the department of Chuquisaca is undoubtedly one of the least studied and threatened by strong pressures, a product of widespread poverty in rural areas and the lack of sustainable development policies. On the other hand, the loss of the traditional knowledge of the communities about their natural resources and their use, obtained over time by man-nature interaction, is being lost in the new generations, identifying a symbiosis with the so-called Western culture. On the other hand, studies of wildlife in the department have been limited to the preparation of quick records and have taken very little into account local knowledge, from which the true economic, cultural and recreational value is obtained.

Hypothesis

There is representative fauna in the PNAMI Serranías del Iñao Protected Area associated with the traditional knowledge of the Quechua and Guaraní communities in the area.

Objectives

General objective

Carry out an inventory of the main groups of wild fauna in representative areas of the department such as protected areas, through the generation of scientific information and traditional knowledge of indigenous and peasant communities.

Specific objectives

- Carry out an inventory of the main groups of wild fauna in representative areas of the department.
- Rescue the traditional knowledge of indigenous and peasant communities about the use of wildlife.
- Identify potential species with food, medicinal, or other value.
- Identify threatened species in the study areas.

Justification

Within the National Plan of the current government there is the Program for the Conservation and Preservation of Biodiversity, in which the management of wildlife is one of the main components, considering that it represents an important resource for indigenous, peasant, which, thanks to their traditional knowledge, use wildlife as a food, medicinal and other resource.

On the other hand, the department of Chuquisaca has important ecoregions in terms of biological and cultural richness, however, from all the studies carried out and incomplete inventories, our Department is one of the least wild fauna studied, which coincides with the absence of local and municipal initiatives that promote the use and sustainable management of wildlife, as an alternative development for communities.

In this sense, the University, as the protagonist of the research processes, has the mission of generating, systematizing and disseminating scientific information through basic and applied research and the training of human resources at the undergraduate and postgraduate levels specialized in this area.

The department of Chuquisaca has ecoregions with representative fauna species such as Tupinamis teguexi (Colorada Iguana), Tremactus Ornatus (spectacled bear) and of great importance due to its biogeographical location (endemic), for being on the red list of animals in danger of extinction and for its value as a resource to local communities.

There are currently two departmental protected areas: ANMI El Palmar and the Serranías del Iñaño National Park and various justification studies for the declaration of Protected Areas in process, however, to date, research on the fauna of the department has been limited to short consultancies for the justification of protected areas and for investigations by Non-Governmental Organizations that take the information, and are not disseminated,

Material and methods activities*Field work*

Of the 36 existing communities in the Serranías del Iñaño, three were chosen, one of Quechua origin and two of Guaraní origin, this due to the logistical capacity in time and resources and, on the other hand, to be able to rescue the local perception from different cultures. A 10-day field trip was carried out, in which a workshop was held with the community and direct observation walks.

All Wildlife indirect method

During the development of the field work, the method used was the Indirect or non-invasive method, as it turned out to be more accessible in terms of time and economic cost, in addition to allowing similar results to those obtained with other more complex techniques. A characteristic of this type of technique is that good series of data can be obtained without affecting the normal development of the activity of the species studied, it consists of systematically recording footprints, feces, hair and natural shelters.

All direct

It was used only for the group of birds using mist nets and Sherman boxes for micro mammals.

Interviews and communal registration

Interviews were conducted with community members and park rangers, with the help of identification catalogs and photographs.

Socialization workshop

The project socialization workshop was held with the communities in consultation with the Director of the Protected Area

Cabinet work

The identification of the fauna species was carried out with the help of taxonomic guides and identification catalogues, making it compatible with the information provided by the community members. Likewise, during this stage, the analysis and systematization of the results was carried out, identifying some species with food potential and others with tourist potential.

Results

It is important to mention that this study has been carried out with IDH resources, it has a duration of two years to date, it has been executed for 8 months, so the results presented represent a single Quechua community of El Zapallar in the Municipality of Monteagudo.

Momifera (Mastozoology) Marsupials

All the species of this order are found within a single Didelphidae family (opossums and carachupas), which are small and medium-sized mammals, with a pointed snout, long tail, soft and dense hair, and a variable weight between 25 gr. Marmosop) and 2 kg. (*Didelphis*). Although only one species of *Didelphys* sp. (carachupa), through tracks and local reports. It is possible that in the study area there are more species of marsupials that have not yet been recorded in field surveys.

Edentates (Xenarthra)

This order is currently made up of three families that are completely different both in habits and in very particular characteristics such as anteaters (Myrmecophagidae), sloths (Bradypodidae) and armadillos (Dasypodidae), these species were registered in this last family, *Dasyus novemcinctus* (tatú) and *Euphractus sexcinctus*, (peji), through direct observation and from caves.



Figure 1 Anteater Cave (*Tamandua tetradactyla*)

Another species in a similar situation is *Tamandua tetradactyla* (anteater), this mammal is arboreal and solitary. Their diet is based on ants, termites and beehives. This species was recorded through skins found in some houses of the locals. Its distribution area is wide, it is normally a rare animal, being a species in danger of being threatened with extinction. The sloth (*Bradypus variegatus*) was only mentioned through local reports.

Species of primates were recorded, all of the Cebidae family (*Cebus apella* and *Alouatta caraya*), these are listed in Appendix II of CITES. The king monkey (*Cebus apella*), is a diurnal, arboreal primate that forms groups of 5 to 20 individuals, they are noisy, they emit alarm calls, it is easy to detect them and they flee quickly.

This species is a good disperser of small seeds and is widely distributed and locally common; probably because of its adaptability to different types of habitats.

Being one of the most commonly observed monkeys in censuses, probably due to its noisy behavior and recorded in all sampling sites.

The species *Alouatta caraya* (howler monkey), is diurnal, arboreal, forms groups of 3 to 19 individuals, emits guttural sounds, audible several kilometers away, generally feeds on leaves and fruits. This species has been defined as an animal that spreads seeds, favoring the regeneration of the forest. Its distribution is wide, locally common, it is a species in danger of being threatened with extinction due to the destruction of its habitats.

Primates have been considered indicator species of habitat quality and fulfill ecological functions in the dispersion and propagation of tree and liana seeds, helping to maintain the balance of the forest. Their disappearance can have negative effects on their ecology (Moro, 1990).

Carnivores

This order is represented by five families Canidae, Ursidae, Procyonidae, Mustelidae and Felidae. The Canidae family with two species *Cerdocyon thous* (fox) and *Pseudalopex* sp (pampa fox), recorded by signs of tracks and feces in the transition zone between fallow land and forest. The species *Pseudalopex* sp. is listed in Appendix II of CITES and the fox *Cerdocyon thous*, is widely distributed and locally common.

The family Ursidae, with the only species *Tremarctos ornatus* (jucumari), which lives in mountains and wooded habitats between 1,800 and 3,000 m altitude. This species was recorded through tracks and local reports; It is listed in Appendix I of CITES, in danger of extinction. Some informants mentioned that it is hunted when it destroys corn fields in the chacos of the area. Within the procyonids, the badger (*Nasua nasua*), mentioned in Appendix III of CITES, was registered by reports of community members. This species is rare and moderately hunted for its meat and for the live animal trade. Another species within this order is the washing bear (*Procyon cancrivorus*), which was recorded by footprints quite frequently in rivers and streams; this species is widely distributed in the study area.

In the Mustelidae family it is represented by 4 species *Conepatus* cf. *chinga*, (skunk), *Lontra longicaudis*, (little river wolf), *Eira barbara*, (melero) and *Galictis vittata* (huron). The most important species in the area, because it is the most threatened, is the river wolf, this mammal is ape-aquatic that feeds on fish and crustaceans, it is in Appendix I of CITES, in danger of extinction, due to the current hunting pressure, the status of their populations are unknown. Among other important species is the skunk (*Conepatus* cf. *chinga*) that was observed during the censuses. The remaining species mentioned above were reported through interviews.

Within the Felidae family there are five species *Leopardus wiedii* (margay), *Leopardus pardalis* (ocelot), *Oncifelis geoffroyi* (wildcat), *Puma concolor* (lion/puma) and *Panthera onca* (tiger/jaguar), which were recorded by evidence (footprints, in the area These species are currently listed in Appendix I of CITES, in danger of extinction.

According to local reports, it is mentioned that the *Puma concolor* (puma) and *Panthera onca* (tiger) species are frequently hunted by ranchers for being predators of calves, sheep and domestic pigs. These species are widely distributed in the area and are in danger due to deforestation and excessive hunting of their prey. Perissodactyla

Tapirs are the only solitary native ungulates and are represented by the Tapiridae family, with the species *Tapirus terrestris* (anta), this was recorded by footprints, feces (dung) and direct observations. The footprints were frequently found in places close to water with herbaceous vegetation, such as riverbanks, lagoons and streams.

This species is listed in Appendix II of CITES, locally common, but rare in regions of excessive hunting. The tapir (*Tapirus terrestris*) has been classified as a frugivorous seed disperser and feces represent a favorable place for seed germination. This ungulate plays an important role in the forest ecosystem (Painter 1999).

Artiodactyls

The order Artiodactyla represented by two families Tayasuidae and Cervidae. The family Tayasuidae with the species *Tayassu tajacu* (taitetu) and *Tayassu peccary* (tropero), were documented by footprints. Both are listed in Appendix II of CITES. These species are widely distributed and locally common, but heavily hunted for meat, leather, or sport.

From the cervidae family, the huaso (*Mazama americana*) and the urina (*Mazama gouazoubira*), currently listed in CITES Appendix III and commercially threatened in the country, have a wide biogeographical distribution in Bolivia.

These species were reliably recorded by observation, tracks, skins, and interviews. It is worth mentioning that these species are hunted in the area because their meat is appreciated.

Rodents (small, medium and large)

These large and medium species were recorded through direct observations, tracks and local reports. The most common in the area was the red jochi (*Dasyprocta punctata*), this species is listed in Appendix III of CITES, heavily hunted for its meat and endangered by the conversion of forests into pastures.

Informal Interviews

A total of 31 species from 17 families belonging to 8 orders of medium and large mammals were recorded, which were reported in interviews with 20 residents of the community of El Zapallar.

The most frequent species in the local reports were: *Dasyypus novemcinctus* (tatu), *Euphractus senxinctus* (peji), *Procyon cancrivorus* (washing bear), *Dasyprocta punctata* (jochi colorado), *Nasua nasua* (badger), *Eira barbara* (melero), *Cebus apella* (martín monkey), *Alouatta caraya* (howler monkey), *Sciurus ignitus* (Bolivian squirrel), *Mazama americana* (huaso), *Mazama gouazoubira* (urina), *Tayassu tajacu* (taitetú), *Puma concolor* (puma), *Leopardus pardalis* (ocelot) and *Cerdocyon thous* (fox)

Teacher and students together with a community member from El Zapallar and the park ranger from the area.

Bird of the order wader



Figure 2 Birds (Ornithology)

This area is characterized by presenting two important forest formations such as the Bolivian-Tucuman forest. In this locality, according to the bibliography consulted (Sjoerd Mayer 2001) and field work, 48 species of birds have been registered, among the most abundant are *Aratinga acuticauda*, *A. mitrata*, *Amazilia chionogaster* (white-bellied hummingbird), *Amazona aestiva*, *Arremon flavirostris*, *Cathartes aura* (peroqui), *Hylocharis chrysura* (tan hummingbird), *Laterallus melanophaius* (silbón donkey), *Coragyps atratus* (sucha), *Penelope obscura* and *Pyrrhura molinae*, as well as those indicators of anthropogenic environments such as *Troglodytes aedon* and *Lesbia nuna*.

The most representative species in the area are: *Aulacorhynchus* sp. *Catharus dryas*, *Phaethornis pretrei* (hermit hummingbird), *Phylloscartes ventralis*, *Todirostrum margaritaceiventer*, *Turdus rufiventris*, *Tyto alba* (owl), *Trogon curucui* (aurora), *T. personatus*, *Thamnophilus caerulescens* (choca), *Synallaxis frontalis* (pijuí), *Sappho sparganura*, *Xiphocolaptes major*, and others.



Figure 3 Reptiles (Herpetology)

Due to the autumn-winter work season, there were very few records, most were recorded from reports from community members and bibliographic information. The Colubridae family seems to be the one with the greatest abundance of species, among which are: *Liophis* sp., *Lystrophis* sp. and *Waglerophis merremii*, followed by the Tropicuridae family, with the species *Stenocercus caducus* and *Tropidurus melanopleurus*. Community Assessment

According to the interviews carried out, it has been possible to identify that the species with the greatest potential as well as threatened are the following:

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Nombre común	Nombre científico	Patrón de uso
Tatu, Quirquincho	<i>Dasyptus novemcinctus</i>	carne, y el caparazón
Jochi colorado, Acuti	<i>Dasyprocta punctata</i>	carne
Sucha	<i>Coragyps atratus (sucha)</i>	Carne
Pava de monte	<i>Penelope</i>	carne
Huaso, Venado	<i>Mazama americana</i>	carne
Urina, Venado	<i>Mazama gouazoubira</i>	carne

Table 1 Species identified with the greatest potential for use

Nombre común	Nombre científico	Patrón de uso
Mono choclero, Mono martin	<i>El mono martin (Cebus apella)</i>	Se los considera una plaga por comer sus maizales y árboles de naranjo
Zorro	<i>Pseudalopex sp</i>	Se lo considera una amenaza por comer sus gallinas.
Tucan	<i>Rhamphastus sp</i>	Lo consideran una plaga por comer sus frutales.

Table 2 Species identified as threatened by the man-nature relationship

According to the exposed results and despite corresponding to only a sample of the study, it can be said that there is representative fauna in the area, however, the results of the community assessment are interesting since most of the species of wild fauna for the community members, they seem to be a problem for invading their crops and livestock. Likewise, it is important to mention that among the species that the community members reported having the greatest difficulty are the chocleras monkeys and the toucans, for causing damage to their fruit trees and crops. On the other hand, the habit of hunting was only reported by a percentage of 10% of the total number of respondents (2 people), likewise they indicate that hunting is carried out by foreign people, and among the species most threatened by hunting are the urinals. and mountain turkeys.

PIERRET (1997), indicates that wild fauna is and will always be important for man who will find in it a source of food, of economic benefit, but also of personal exaltation and pleasure when seeing free fauna in nature; indicates that wild animals are the only source of protein for indigenous and peasant populations, where the poor development of livestock and the high costs of their products, do not allow their inhabitants any other way out than to provide themselves with meat from the bush of mammals, birds, reptiles and also fish. On the other hand OLIVER (2000), says that wildlife has been part and is still today, a preponderant element in the daily, artistic and cultural life of indigenous peoples and peasants.

Undoubtedly, these authors and the majority indicate that the main value of wildlife is its food potential, however, the preliminary results obtained show us that wildlife can not only represent a nutritional contribution but also can become a threat when there are no management programs, undoubtedly when wild animals begin to invade rural populations it is because there is some imbalance in their habitat, possibly the presence of monkeys and toucans in the crops of the community of El Zapallar, are indicators of fragmentation of the forests or other disturbances, hence the need to implement deeper studies of the populations of these animals to be able to propose management plans, Likewise, environmental education processes aimed at valuing wildlife, rescuing intangible value such as ecological value, make it necessary to work in these communities where there is a certain conflict with wildlife.

Conclusions

The PNANMI Serranías del Iñao Protected Area, represented in this study by the community of El Zapallar, as it is located within the Bolivian Tucumana plant formation, has representative fauna.

Within the community assessment, (rescue of local knowledge) the main value in the area is food and to a lesser extent medicinal, considering fauna as a complement to their food diet, there is no clear knowledge about the value of fauna as an ecotourism resource or its trophic roles in habitats.

It has been possible to inventory 31 species of mammals and 29 species of birds with indirect records and very few direct records. It is necessary to reinforce these data with more direct records.

Potential species have been identified according to interviews and surveys, with nutritional value: mazama guazoubira, mazama americana (urina, huazo, deer).

Likewise, three species have been identified that cause a certain conflict in the area: *Cebus apella*, *Pseudalopex sp* and *Rhamphastus sp*, for which studies should be carried out aimed at management programs and environmental education, for the acotourism and ecological assessment of these species.

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